PAPER 9 - OPERATIONS MANAGEMENT & INFORMATION SYSTEM

The following table lists the learning objectives and the verbs that appear in the syllabus learning aims and examination questions:

	Learning objectives	Verbs used	Definition
LEVEL B	KNOWLEDGE What you are expected to know	List	Make a list of
		State	Express, fully or clearly, the details/facts
		Define	Give the exact meaning of
	COMPREHENSION What you are expected to understand	Describe	Communicate the key features of
		Distinguish	Highlight the differences between
		Explain	Make clear or intelligible/ state the meaning or purpose of
		Identity	Recognize, establish or select after consideration
		Illustrate	Use an example to describe or explain something
	APPLICATION How you are expected to apply your knowledge	Apply	Put to practical use
		Calculate	Ascertain or reckon mathematically
		Demonstrate	Prove with certainty or exhibit by practical means
		Prepare	Make or get ready for use
		Reconcile	Make or prove consistent/ compatible
		Solve	Find an answer to
		Tabulate	Arrange in a table
	ANALYSIS How you are expected to analyse the detail of what you have learned	Analyse	Examine in detail the structure of
		Categorise	Place into a defined class or division
		Compare and contrast	Show the similarities and/or differences between
		Construct	Build up or compile
		Prioritise	Place in order of priority or sequence for action
		Produce	Create or bring into existence

Paper 9 - Operations Management & Information System

Full Marks: 100   **Time allowed-3hrs**

This paper contains 3 questions. All questions are compulsory, subject to instruction provided against each question. All workings must form part of your answer. Assumptions, if any, must be clearly indicted.

1. Answer all questions: **[10×2 = 20]**

    (a) Calculate EBQ from the details: Monthly demand -8000 units, setting up costs per batch - ₹400, cost of manufacture per unit - ₹60, rate of interest – 10% p.a.

    (b) Define Total Productivity.

    (c) Explain Line of Balance technique.

    (d) Explain Flow Process Chart.

    (e) Explain Delayed Differentiation.

    (f) List the disadvantages of Vertical Integration.

    (g) Explain regressing testing.

    (h) Define Iconic scale model.

    (i) State the important networking issues relating to ERP Implementation.

    (j) State the meaning of the term 'Key pair'.

Operations Management

2. Answer any three questions :

  (a) (i) List the basic steps in Strategic Bench trending.   **[6]**

      (ii) At a small store of readymade garments, there is one clerk at the counter who is to check bills, receive payments and place the packed garments into fancy bags. The arrival of customer at the store is random and service time varies from one minute to six minutes, the frequency distribution for which is given below:

Time between Arrivals (minutes)	Frequency	Service Time (minutes)	Frequency
1	5	1	1
2	20	2	2
3	35	3	4
4	25	4	2
5	10	5	1
6	5	6	0

        The store starts work at 11 a.m. and closes at 12 noon for lunch and the customers are served on the "first came first served basis". Using Monte Carlo simulation technique, find average length of waiting line, average waiting time, average service time and total time spent by a customer in system.

You are given the following set of random numbers, first twenty for arrivals and last twenty for service:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
64	04	02	70	03	60	16	18	36	38	07	08	59	53	01	62	36	27	97	86
30	75	38	24	57	09	12	18	65	25	11	79	61	77	10	16	55	52	59	63

[10]

(b) (i) The owner of Modern Goods Shop is interested to determine,how many advertisements to release in the selected three magazines A,B and C. His main purpose is to advertise in such a way that total exposure to principal buyers of his goods is maximized. Percentages of readers for each magazine are known. Exposure in any particular magazine is the number of advertisements released multiplied by the number of principal buyers. The following data are available:

Particulars	A	B	C
Readers	1.0 lakhs	0.6 lakhs	0.4 lakhs
Principal buyers	20%	15%	8%
Cost per advertisement	₹8,000	₹6,000	₹5,000

The budgeted amount is at the most ₹1.0 lakh for the advertisements. The owner has already decided that magazine A should have no more than 15 advertisements and that B and C each gets at least 8 Advertisements. Formulate a Linear Programming model for this problem. **[8]**

(ii) List the activities and responsibilities of product design. **[4]**

(iii) State the actions by which maximum capacity can be increased. **[4]**

(c) (i) The following list of activities must be accomplished in order to complete a construction project: (Duration in weeks)

Activity	A	B	C	D	E	F	G	H	I	J	K
Time	3	8	9	6	10	14	11	10	5	4	1
Predecessors	—	—	A	B	C	C	CD	FG	E	I	H

Draw network. Determine the critical path and duration of the project. Calculate EST, EFT, LST and LFT. Also find total float of each activity. **[8]**

(ii) Well-done Company has taken the third floor of a multistoried building for rent with a view to locate one of their zonal offices. There are five main rooms in this floor to be assigned to five managers. Each room has its own advantages and disadvantages. Some have windows; some are closer to the washrooms or to the canteen or secretarial pool. The rooms are of different sizes and shapes. Each of the five

managers was asked to rank their room preferences among the rooms 201, 202, 203, 204, and 205. Their preferences were recorded in a table as indicated below:

Manager				
M1	M2	M3	M4	M5
202	202	203	202	201
203	204	201	205	202
204	205	204	204	204
	201	205	203	
		202		

Most of the managers did not list all the five rooms since they were not satisfied with some of these rooms and they have left off these from the list. Assuming that their preferences can be quantified by numbers, find out as to which manager should be assigned to which rooms so that their total preferences ranking is a minimum. **[8]**

(d) (i) The demand for computers has been rising rapidly since 2005. The following data are for one of the metropolitan cities. Fit a quadratic curve to the data and forecast the demand during years 2014, 2015, 2016, 2017 and 2018.

Year	Demand ('000)
2005	25
2006	35
2007	50
2008	65
2009	85
2010	115
2011	150
2012	205
2013	285

[8]

(ii) An electric company which generates and distributes electricity conducted a study on the life of poles. The repatriate life data are given in the following table:

Life data of electric poles

Year after installation:	1	2	3	4	5	6	7	8	9	10
Percentage poles failing:	1	2	3	5	7	12	20	30	16	4

1. If the company now installs 5,000 poles and follows a policy of replacing poles only when they fail, how many poles are expected to be replaced each year during the next ten years?

   To simplify the computation assume that failures occur and replacements are made only at the end of a year.

2. If the cost of replacing individually is ₹ 160 per pole and if we have a common group replacement policy it costs ₹ 80 per pole, find out the optimal period for group replacement. **[8]**

Information System

3. Answer any two questions:

(a) (i)   Describe the different Dynamic Analysis Testing.   **[5]**

    (ii)   Discuss the importance of Marketing Information System.   **[7]**

    (iii) List the policy and procedure to be followed for effective management of human resources.   **[4]**

(b) (i)   Describe the two main types of Data Manipulation Languages(DMLs).   **[4]**

    (ii)   Describe the payroll master file update.   **[8]**

    (iii) Write a note on detailed system process tools.   **[4]**

(c) (i)   Write a note on E-commerce Jurisdiction.   **[4]**

    (ii)   Describe Electronic Data Interchange.   **[7]**

    (ii)   'Selection process of ERP packages constitutes various stages' – List them.   **[5]**